REMARKS

Claims 1-15, 17-18, 20-22 and 24-26 are pending in the application.

Claims 15, 17-18, 20-21 and 25-26 are objected to.

Claims 1-15, 17-18, 20-22 and 24-26 are rejected under 35 U.S.C. § 112.

Claims 1-15, 17-18, 20-22 and 24-26 are rejected under 35 U.S.C. § 103(a).

Claims 1, 4, 12, 15, 17-18, 20, 22 and 24-26 are amended.

No new matter is added.

Applicants request reconsideration and allowance of the claims in light of the above amendments and following remarks.

Claim Objections

Claims 15, 17-18, 20-21 and 25-26 are objected to because the phrase "the liner material layer" in these claims should be replaced with the phrase "the conformal liner material layer." Applicants hereby amend claims 15, 17-18, 20 and 25-26 consistent with the suggestion provided in the Office Action and further submit that claim 21 does not recite the phrase "the liner material layer." Accordingly, Applicants respectfully request withdrawal of the present objection to the claims.

Claim Rejections – 35 U.S.C. § 112

Claims 1-15, 17-18, 20-22 and 24-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, claims 1 and 12 are rejected because these claims fail to "definitely define the relationship(s) among ... [the oxide layer, the thermal oxide layer and the CVD oxide layer]; and/or they each fail to clarify whether the thermal oxide layer and the CVD oxide layer are definitely comprised in the recited 'an oxide layer.'" Applicants respectfully disagree with the basis for the rejection but amend claims 1 and 12 to further clarify the methods recited therein.

Specifically, amended claim 1 is drawn to a method of forming a composite oxide layer that includes growing a thermal oxide layer and forming a CVD oxide layer directly on the thermal oxide layer. Thus, claim 1 definitely recites that the method of forming the composite oxide layer wherein the thermal oxide layer and the CVD oxide layer are comprised in the

composite oxide layer. In addition, claim 1 definitely defines the relationship between the thermal oxide layer and the CVD oxide layer because claim 1 recites "forming a CVD oxide layer directly on the thermal oxide layer." Claim 12 has been amended in a similar manner as discussed above with respect to claim 1.

In view of the amendments discussed above, Applicants submit that claims 1 and 12 fully comply with the requirements of 35 U.S.C. § 112, second paragraph, and request withdrawal of the present rejection.

Applicants respectfully submit that the rejection of claims 4-6 and 10 under 35 U.S.C. § 112, second paragraph, is moot in view of the amendments discussed above with respect to claim 1.

Claims 15 and 22 are rejected because they each recite "the terms of 'a single crystalline silicon substrate' and 'of single crystalline silicon substrate,' but fail to clarify what is/are their relationship(s)." Applicant hereby amends claim 15 to recite "wherein a thickness of ... of *the* single crystalline silicon substrate is consumed..." (*emphasis added*) to indicate that the first and last elements recited in claim 15 refer to the same single crystalline silicon substrate. Claim 22 has been amended in a similar manner as discussed above with respect to claim 15.

In view of the amendments discussed above, Applicants submit that claims 15 and 22 fully comply with the requirements of 35 U.S.C. § 112, second paragraph, and request withdrawal of the present rejection.

Claim 15 is further rejected because this claim fails to "definitely define the relationship(s) among ... [the layer, the nitride liner layer, the oxide layer, the thermal oxide layer and the CVD conformal liner material layer]; and/or they each fail to clarify which of these recited layer(s) is/are definitely in included in which of these recited layer(s)." Applicants respectfully disagree with the basis for the rejection but amend claim 15 to further clarify the method recited therein.

Specifically, amended claim 15 is drawn to a method of forming an integrated circuit device that includes forming a composite oxide layer and forming a nitride liner layer on the composite oxide layer. Thus, claim 15 definitely defines the relationship between the composite oxide layer and the nitride liner layer because claim 15 recites "forming a nitride liner layer on the composite oxide layer." Moreover, claim definitely defines the relationship between the thermal oxide layer and CVD conformal liner material layer, both of which are comprised in the

composite oxide layer, because claim 15 recites "forming a thermal oxide layer" and "forming a CVD conformal liner material layer directly on the thermal oxide layer."

In view of the amendments discussed above, Applicants submit that claim 15 fully complies with the requirements of 35 U.S.C. § 112, second paragraph, and request withdrawal of the present rejection.

Claim Rejections – 35 U.S.C. § 103

Claims 1-10 and 12-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent App. Pub. No. 2002/0121661 to Nakamura (hereinafter "Nakamura") in view of U.S. Patent No. 6,228,166 issued to Suzuki, et al. (hereinafter "Suzuki") and/or U.S. Patent No. 6,231,673 issued to Maeda (hereinafter "Maeda") and/or U.S. Patent No. 5,904,542 issued to Gilmer, et al. (hereinafter "Gilmer"). Applicants respectfully traverse this rejection.

Rejecting claims 1 and 12, the Office Action asserts that "[a]though Nakamura does not expressly disclose ... the thermal oxide can also be formed inside the same CVD apparatus, one of ordinary skill in the art would readily recognize that such thermal oxide layer can be desirably formed in the same CVD apparatus, so as to simplify the process and/or reduce the process cost and/or time, as readily evidenced in Suzuki... Maeda... and Gilmer." Nevertheless, Applicants note that neither Suzuki, Maeda nor Gilmer teach or suggest forming a thermal oxide layer and a CVD oxide layer in the same CVD apparatus.

Specifically, Suzuki states at column 10, lines 13-27 that "the thermal oxide growth was implemented at 10 torr in a CVD growth chamber ... and ... the thermally grown oxide has a thickness of 20 angstrom." Suzuki, however, is silent as to any teaching or suggestion that a CVD oxide film is also grown in the CVD growth chamber disclosed therein. Maeda states at column 15, lines 51-53 that "[t]his apparatus 85 is configured as a heat treatment system available for processing such as heat treatment, thermal oxidation, and CVD processing." While the apparatus 85 may be configured to perform thermal oxidation and CVD processing, Maeda still fails to teach or suggest that thermal oxidation and formation of a CVD oxide layer are actually performed therein. Lastly, Gilmer teaches at column 4, lines 2-6 that "a CVD chamber may be adapted with a heating element and adapted to receive oxygen for the thermal oxide growth processes...." Notwithstanding this disclosure, Gilmer fails to teach or suggest that the CVD chamber is actually used to form a thermal oxide layer and a CVD oxide layer.

In view of the above, Applicants respectfully submit that none of the cited references teach each and every element recited in claims 1 and 12 and therefore fail to render claims 1 and 12 obvious. See M.P.E.P. § 2143.03.

Further, as set forth at M.P.E.P. 2142, the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on applicant's disclosure. Applicants respectfully submit, however, that none of Suzuki, Maeda, or Gilmer teaches or suggests that forming the thermal oxide film 9a and the CVD oxide film 10a of Nakamura in the same CVD chamber would "simplify the process" or "reduce the process cost and/or time" as suggested in the Office Action. Moreover, Applicants note that the only source of motivation to modify Nakamura "so as to simplify the process" is found in the Abstract of Applicants' disclosure.

In view of the above, Applicants respectfully submit that the combination of references fails to suggest each and every element recited in claims 1 and 12 and therefore fails to render claims 1 and 12 obvious. See M.P.E.P. § 2141.

Claims 2-10, 13 and 14 variously depend from claims 1 and 12 and, therefore, include each and every element variously recited in claims 1 and 12. Accordingly, Applicants respectfully submit that the combination of Nakamura in view of Suzuki, Maeda, and/or Gilmer fails to render claims 2-10, 13 and 14 obvious for at least the reasons presented above with respect to claims 1 and 12.

Claims 11, 15, 17-18, 20-22 and 24-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,140,208 issued to Agahi, et al. (hereinafter "Agahi") in view of Nakamura and/or U.S. Patent No. 6,103,557 issued to Nakanishi (hereinafter "Nakanishi"), and further in view of Suzuki, Maeda and/or Gilmer. Applicants respectfully traverse this rejection.

Rejecting claims 11, 15 and 22, the Office Action asserts that it would have been obvious to form the insulating oxide layer 20 of Agahi "inside a ... CVD apparatus... [because] one of ordinary skill in the art would readily recognize that an oxide liner [(i.e., the insulating oxide layer 20 of Agahi)] can be desirably formed with CVD method so as to achieve the desired liner conformity, as evidenced in Nakamura...."

Even if Nakamura teaches that a CVD oxide layer can be conformally deposited, Applicants respectfully submit that such a fact is insufficient to establish a *prima facie* case of

obviousness because Agahi discloses that the insulating oxide layer 20 is conformally deposited using sputter techniques. See Agahi, column 5, lines 44-46. Because the alleged benefits of forming the insulating oxide layer 20 of Agahi according to CVD techniques (i.e., layer conformity) are already present in Agahi without modification, Applicants respectfully submit that it would not be desirable to modify Agahi using Nakamura as proposed "to achieve desired liner conformity" as suggested in the Office Action. Because it would not be desirable to modify Agahi using Nakamura as proposed "to achieve desired liner conformity" as suggested in the Office Action, Applicants respectfully submit that the proposed combination of Agahi in view of the cited references including Nakamura fails to render claims 11, 15 and 22 obvious. See M.P.E.P. 2143.01(I) and (IV).

Further rejecting claims 11, 15 and 22, the Office Action asserts that it would have been obvious to form the thermal oxide 23, the insulating oxide layer 20 and the silicon nitride line 43 of Agahi "inside a same CVD apparatus... [because] one of ordinary skill in the art would readily recognize... that an oxide layer and a nitride layer can both be formed through CVD in a same CVD apparatus so as to simplify the process, as evidenced in Nakanishi...."

Applicants respectfully submit, however, that Nakanishi teaches forming a silicon oxide and silicon nitride films within the same plasma CVD chamber. Nakanishi further characterizes plasma CVD methods as being "highly flexible" and allowing silicon oxide and nitride deposition at "a low temperature of 400°C." See Nakanishi, column 2, lines 16-19. Nakanishi is silent as to any teaching or suggestion that the thermal oxide 23 of Agahi (which is formed at a temperature of about 1,000°C; see Agahi, column 5, lines 40-41) could even be formed in the plasma CVD chamber described in Nakanishi. Accordingly, Applicants respectfully submit that the combination of Agahi in view of Nakamura and/or Nakanishi, and further in view of Suzuki, Maeda and/or Gilmer fails to teach or suggest each and every element recited in claims 11, 15 and 22 and, therefore, fails to render the claims obvious. See M.P.E.P. § 2143.03.

Finally, Applicants note that claim 11 depends from claim 1 and that elements recited in claims 15 and 22 are similar to those recited claim 1. Accordingly arguments presented above with respect to the rejection of claim 1 (i.e., regarding the alleged teachings and suggestions obtained from Suzuki, Maeda and Gilmer) are also applicable with respect to the rejection of claims 11, 15 and 22.

Claims 17-18, 20-21 and 24-26 variously depend from claims 15 and 22 and, therefore, include each and every element variously recited in claims 15 and 22. Accordingly, Applicants respectfully submit that the combination of Agahi in view of Nakamura and/or Nakanishi, and further in view of Suzuki, Maeda and/or Gilmer fails to render claims 17-18, 20-21 and 24-26 obvious for at least the reasons presented above with respect to claims 15 and 22.

CONCLUSION

For the foregoing reasons, reconsideration and allowance of claims 1-15, 17-18, 20-22 and 24-26 of the application as amended is requested. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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